

**5-9****Skills Practice**
Complex Numbers

Simplify.

1. $\sqrt{-36}$

2. $\sqrt{-196}$

3. $\sqrt{-81x^6}$

4. $\sqrt{-23} \cdot \sqrt{-46}$

5. $(3i)(-2i)(5i)$

6. i^{11}

7. i^{65}

8. $(7 - 8i) + (-12 - 4i)$

9. $(-3 + 5i) + (18 - 7i)$

10. $(10 - 4i) - (7 + 3i)$

11. $(2 + i)(2 + 3i)$

12. $(2 + i)(3 - 5i)$

13. $(7 - 6i)(2 - 3i)$

14. $(3 + 4i)(3 - 4i)$

15. $\frac{8 - 6i}{3i}$

16. $\frac{3i}{4 + 2i}$

Solve each equation.

17. $3x^2 + 3 = 0$

18. $5x^2 + 125 = 0$

19. $4x^2 + 20 = 0$

20. $-x^2 - 16 = 0$

21. $x^2 + 18 = 0$

22. $8x^2 + 96 = 0$

Find the values of m and n that make each equation true.

23. $20 - 12i = 5m + 4ni$

24. $m - 16i = 3 - 2ni$

25. $(4 + m) + 2ni = 9 + 14i$

26. $(3 - n) + (7m - 14)i = 1 + 7i$

5-9

Practice

Complex Numbers

Simplify.

1. $\sqrt{-49}$

2. $6\sqrt{-12}$

3. $\sqrt{-121s^8}$

4. $\sqrt{-36a^3b^4}$

5. $\sqrt{-8} \cdot \sqrt{-32}$

6. $\sqrt{-15} \cdot \sqrt{-25}$

7. $(-3i)(4i)(-5i)$

8. $(7i)^2(6i)$

9. i^{42}

10. i^{55}

11. i^{89}

12. $(5 - 2i) + (-13 - 8i)$

13. $(7 - 6i) + (9 + 11i)$

14. $(-12 + 48i) + (15 + 21i)$

15. $(10 + 15i) - (48 - 30i)$

16. $(28 - 4i) - (10 - 30i)$

17. $(6 - 4i)(6 + 4i)$

18. $(8 - 11i)(8 - 11i)$

19. $(4 + 3i)(2 - 5i)$

20. $(7 + 2i)(9 - 6i)$

21. $\frac{6 + 5i}{-2i}$

22. $\frac{2}{7 - 8i}$

23. $\frac{3 - i}{2 - i}$

24. $\frac{2 - 4i}{1 + 3i}$

Solve each equation.

25. $5n^2 + 35 = 0$

26. $2m^2 + 10 = 0$

27. $4m^2 + 76 = 0$

28. $-2m^2 - 6 = 0$

29. $-5m^2 - 65 = 0$

30. $\frac{3}{4}x^2 + 12 = 0$

Find the values of m and n that make each equation true.

31. $15 - 28i = 3m + 4ni$

32. $(6 - m) + 3ni = -12 + 27i$

33. $(3m + 4) + (3 - n)i = 16 - 3i$

34. $(7 + n) + (4m - 10)i = 3 - 6i$

35. **ELECTRICITY** The impedance in one part of a series circuit is $1 + 3j$ ohms and the impedance in another part of the circuit is $7 - 5j$ ohms. Add these complex numbers to find the total impedance in the circuit.

36. **ELECTRICITY** Using the formula $E = IZ$, find the voltage E in a circuit when the current I is $3 - j$ amps and the impedance Z is $3 + 2j$ ohms.